UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/825,607	04/03/2001	Yasutomo Yamamoto	16869P025300	3277

20350   7590   09/09/2003

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EXAMINER
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ART UNIT	PAPER NUMBER
2188	

DATE MAILED: 09/09/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No.	Applicant(s)
	09/825,607	YAMAMOTO ET AL.
	Examiner	Art Unit
	Jasmine Song	2188

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _03 April 2001_ .

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-10_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1-10_ is/are rejected.

7) ☒ Claim(s) _1-2, 5-6 and 9_ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on _03 April 2001_ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

        1. ☐ Certified copies of the priority documents have been received.

        2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

        3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____ .

Detailed Action

1.   Claims 1-10 are represented for examination.

Specification

2.   The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Drawings

3.   The drawings filed on 04/03/2001 have been approved by the Examiner.

Oath/Declaration

4.   The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in 37 C.F.R. 1.63.

Title

5.   The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

6.   Claims 1, 2, 5, 6, 9 are objected to because of the following informalities:

In claim 1, lines 9, delete the second occurrence "retrieving".

In claim 1, lines 12, delete the second occurrence "transferring".

In claim 1, lines 15, delete the second occurrence "storing".

In claim 1, lines 18, delete the second occurrence " copying".

In claim 2, lines 2, delete the second occurrence " notifying".

In claim 5, lines 3, delete the second occurrence "recording accesses".

In claim 6, lines 5, delete the second occurrence "retrieving".

In claim 6, lines 8, delete the second occurrence "transferring".

In claim 9, lines 3, delete the second occurrence "registering".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

7.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8.   Claims 6-9 are rejected under 35 U.S.C. 102(b) as being anticipated by

Yamamoto et al., U.S. Patent 5,956,750.

Regarding claim 6, Yamamoto teaches that an information processing device

(fig.1, element 1) connected to a storage device (Fig.1, storage controller 104 and

physical disk device 105) including a plurality of disk devices (fig.1, physical disk

devices 105) comprising:

means for storing information registering information about mapping relationships between said plurality of disk devices and logical storage regions (Fig.1, logical-physical device mapping information 300 within the storage controller 104);

means for retrieving from said information storing means information indicating a range of a destination disk device (col.6, lines 11-14) when data recorded on one disk device out of said plurality of disk devices is to be moved to another disk device (Fig.6, the director 106 conducts transfers of data between the cache memory 107 and the physical disk devices 105);;

means for transferring to said storage device information indicating a range in said destination disk device retrieved by said retrieving means (Fig.3, col.5, lines 5-7 and lines 22-24) and a range of data to be moved (col.6, lines 3-10); and

means for updating mapping information between said disk devices and said logical storage regions in said information storing means after moving of said data is finished (Fig.7, step 707 and col.7, lines 48-50).

Regarding claim 7, Yamamoto teaches that said retrieving means includes:

means for searching said information storing means for a physical storage region in said disk device that has not been assigned to a logical storage region (it is taught as the calculation process of access position, col.6, lines 11-14 and Fig.8, col.7, lines 55 to col.8, lines 11); and

means for retrieving said physical storage region found by said searching means as a range in said destination disk device (col.6, lines 5-10).

Regarding claim 8, Yamamoto teaches that said transferring means issues write

instructions to a predetermined disk device out of said disk devices in said storage

device using said information as data (it is taught as the necessity of the reallocation of

logical disk devices, col.6, lines 43-46).

Regarding claim 9, Yamamoto teaches that a storage device (physical disk

device as shown in Fig.6) connected to a host computer (Fig.6, element 100)

comprising:

a plurality of storage regions (logical disk devices 200 as shown in Fig.6);

means for registering information about said plurality of storage regions not used

by said host computer (it is taught as the logical-physical device mapping information as

shown in Fig.6);

means for selecting one of said registered storage regions based on information

from outside of said storage device (it is taught as specified information indicated the

reallocation of logical disk device, Fig.6, 620); and

means for moving data to said selected storage region from another of said

storage regions (it is taught as the reallocation process of logical disk device as shown

in Fig.6).

Claim Rejections - 35 USC § 103

9.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

10.   Claims 1-5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Yamamoto et al., U.S. Patent 5,956,750, in view of Lee et al., U.S. Patent

6,564,219 B1.

Regarding claim 1, Yamamoto teaches that an information processing system

(Fig.1, element 1) comprising:

a host computer (Fig.1, element 100); and

a storage device (Fig.1, storage controller 104 and physical disk devices 105)

connected to said host computer and including a plurality of disk devices (Fig.1,

physical disk devices 105);

wherein said storage controller includes:

means for storing information registering information about mapping relationships

between said plurality of disk devices and logical storage regions (Fig.1, logical-physical

device mapping information 300 within the storage controller 104);

means for retrieving from said information storing means information indicating a

range of a destination disk device (col.6, lines 11-14) when data recorded on one disk

device out of said plurality of disk devices is to be moved to another disk device (Fig.6,

the director 106 conducts transfers of data between the cache memory 107 and the

physical disk devices 105); and

means for transferring to said storage device information indicating a range in a

disk device retrieved by said retrieving means (Fig.3, col.5, lines 5-7 and lines 22-24)

and a range of data to be moved (col.6, lines 3-10);

said storage device includes:

means for storing said information transferred (col.5, lines 5-7, it is taught as the

information related to the area in the physical disk device 105 to which each logical disk

device 200 is allocated, and this information is stored in the mapping information 300)

by said transferring means;

means for reading data for said source out of said information stored (col.4, lines

60-67 and col.6, lines 17-21) in said storing means using said information indicating

said range of data to be moved; and

means for copying to said destination disk device information indicating said

region in said destination disk (it is taught as the process of reallocation of logical disk

device as shown in Fig.7) out of said information stored in said storing means.

Yamamoto does not teach that the host computer including the mapping

information. However, Yamamoto teaches the storage controller including the mapping

information instead (Fig.1).

However, Lee et al. teach that the host computer 110 including the mapping

layer 320 which maps each logical object specified in application space to one or more

unique locations in physical space (col.8, lines 61-63 and lines 66 to col.9, lines 12).

As taught by Lee, the use of mapping information on the host computer is advantageous to minimize delays inherent in accessing this information (col.12, lines 60-62). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Lee in the system of Yamamoto and have the mapping information on the host computer for the advantages stated above.

Accordingly, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor. This would have motivated one of ordinary skill in the art to implement the above combination for the advantages set forth above.

Regarding claim 2, Yamamoto teaches that said storage device includes means for notifying said host computer that said copying means has finished (Fig.7, step 702,col. 7, lines 3-6); and said host computer includes means for updating mapping relations between disk devices and logical storage regions registered in said information storing means after receiving said notifying means (Fig.7, step 707 and col.7, lines 48-50).

Regarding claim 3, Yamamoto teaches that said host computer includes means for stopping access to data being transferred when said disk device is transferring data (Fig.8, step 800to step 803 or step 800 to step 802).

Regarding claim 4, Yamamoto teaches that said transferring means includes means for issuing instructions for writing said information to a predetermined disk device out of said plurality of disk devices (col.6, lines 43-46); and said storing device includes means for executing said reading means (col.4, lines 60-67 and col.6, lines 17-21) and said copying means (col.6, lines 58-60) when said information written by said issuing means is read by said storage device.

Regarding claim 5, Yamamoto teaches that said storage device includes: means for recording accesses when an access takes place for data copied by said copying means (col.4, lines 32-34); and means for matching data contents of source data and destination data according to contents recorded by said access recording means (col.4, lines 44-65).

Regarding claim 10, Yamamoto teaches that in an information processing device (Fig.1, element 1) including a host computer (Fig.1, element 100) and a storage device (Fig.1, storage controller 104 and physical disk devices 105) connected to said host computer and equipped with a plurality of disk devices (Fig.1, physical disk devices 105),

a method for rearranging data in said plurality of disk devices comprising the steps of:

in said host computer,

determining a first disk device storing data to be rearranged (Fig.6, it is taught as

data transfer between the cache memory 107 and the physical disk devices 105);

retrieving information about a second disk device to be a destination for said

rearrangement (It is taught as the logical-physical device mapping information 300); and

sending said determined information about said first disk device and said

retrieved information about said second disk device to said storage device (it is taught

as the process of reallocation of logical disk device according to the information of

accessing, col.4, lines 60-65);

in said storage device,

reading data from said first disk device based on said sent information about said

first disk device (Fig.4, logical disk information);

storing said data read from said first disk device based on said sent information

about said second disk device (col.4, lies 44-47);

notifying said host computer of completion of storing when storing of said read

data is completed (fig.7, step 702); and

updating a table in the storage controller containing mapping relations between

logical and physical regions in said plurality of disk devices after said notification (Fig.7,

step 707).

Yamamoto does not teach that the host computer including the mapping

information, however, Yamamoto teaches the storage controller including the mapping

information instead (Fig.1).

However, Lee et al. teach that the host computer 110 including the mapping layer 320 which maps each logical object specified in application space to one or more unique locations in physical space (col.8, lines 61-63 and lines 66 to col.9, lines 12).

As taught by Lee, the use of mapping information on the host computer is advantageous to minimize delays inherent in accessing this information (col.12, lines 60-62). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Lee in the system of Yamamoto and have the mapping information on the host compute for the advantages stated above.

Accordingly, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor. This would have motivated one of ordinary skill in the art to implement the above combination for the advantages set forth above.

Conclusion

11.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Yamamoto et al.,	US 2002/0004845 A1
Yamamoto et al.,	US 6446161 B1
Yamamoto et al.,	US 2001/0023463 A1
Bolt	US 6467014 B1
Shank et al.,	US 6145028
Venkatesh et al.,	US 6397292 B1

Yorimitsu	US 5845319
Shepherd	US 6529995 B1
D'Errico	US 6216202 B1
Kedem	US 6484234 B1

12.   When responding to the office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections. See 37 C.F.R. 1.111 (c).

13.   When responding to the office action, Applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

14.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jasmine Song whose telephone number is 703-305-7701. The examiner can normally be reached on 8:00-4:30.

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 703-306-2903. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-7238 for regular communications and 703-746-7239 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Jasmine Song

Patent Examiner

September 4, 2003

Mano Padmanabhan

Supervisory Patent Examiner

Technology Center 2100